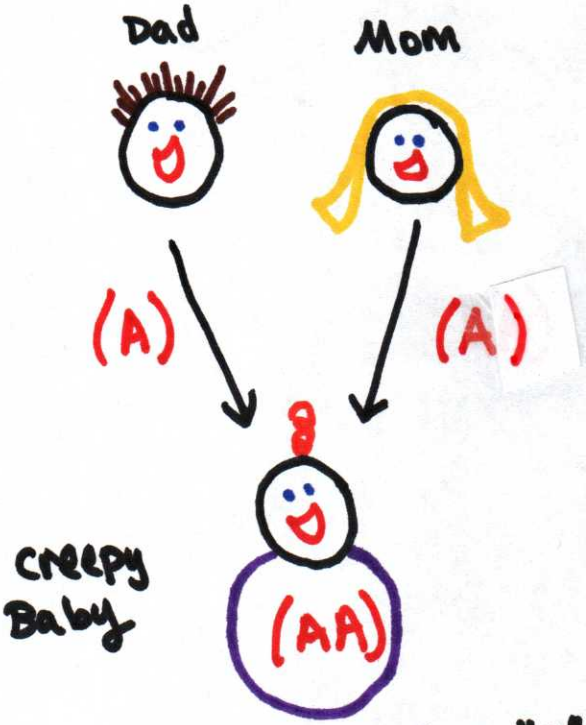
Hardy-Weinberg Equilibrium: Genotype Frequencies Equation

$$p^2 + 2pq + q^2 = 1$$

Frequency of The Homozygous Dominant Genotype

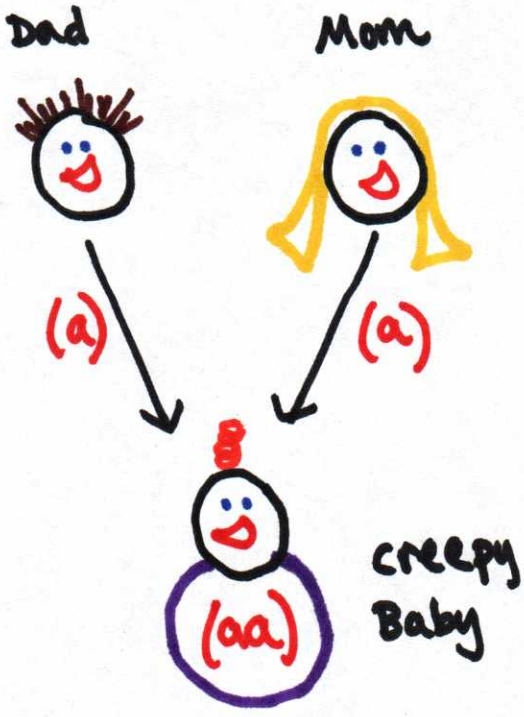
$(AA) = p^2$



since you can receive "A" from Dad and "A" from Mom at the same time, multiply the frequency of receiving "A" from Dad (p) by the frequency of receiving "A" from Mom (p) to get the frequency that both will occur at the same time ($p \times p = \boxed{p^2}$). This is called the multiplication Rule of probabilities.

Frequency of The Homozygous Recessive Genotype

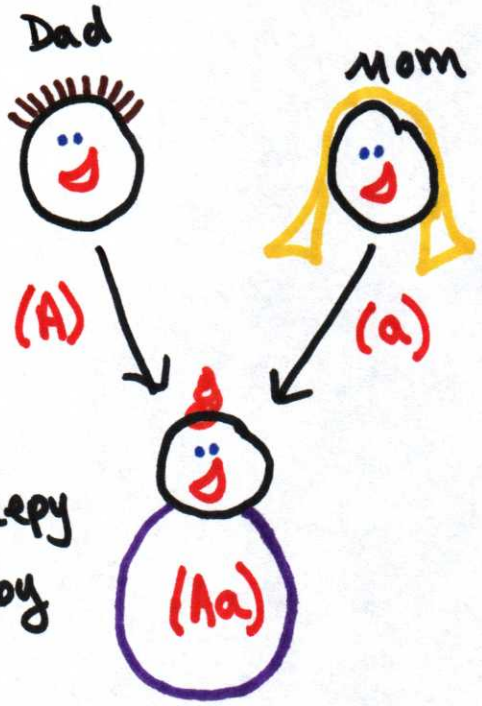
$(aa) = q^2$



According to the rule at left, to get the frequency of receiving "a" from Dad and "a" from Mom at the same time, multiply their individual frequencies ($q \times q = \boxed{q^2}$).

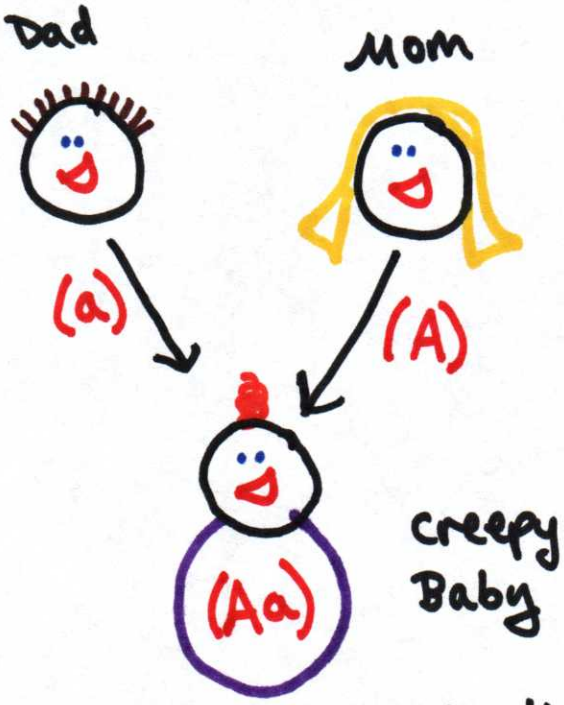
Frequency of the Heterozygous Genotype

$(Aa) = 2pq$



According to the Multiplication Rule of Probabilities, the frequency of this occuring is

$p \times q = \boxed{pq}$



According to the Multiplication Rule of Probabilities, the frequency of this occuring is

$p \times q = \boxed{pq}$

Since these two things can't happen at the same time (i.e., a single baby can't receive an "A" from dad and an "a" from Mom at the same time he receives an "a" from Dad and an "A" from Mom), we add their individual probabilities to determine the probability that either one or the other will occur ($pq + pq = \boxed{2pq}$) ... This is called the <u>Addition Rule of Probabilities</u>.